PTO/SB/21 (08-03)

TRADEMAN			t and Trademark Offic	e; U.S. D	gh 08/30/2003. OMB 0651-0031 EPARTMENT OF COMMERCE			
Under the Paperwork Re	duction Act of 1995, no person	s are required to respond to a collection Application Number	10/709,054	s it displa	ivs a valid OMB control number.			
TRANSI	MITTAL	Filing Date	04/09/2004					
FORM		First Named Inventor	SHAO-KANG CHAN	G	· · · · · · · · · · · · · · · · · · ·			
(to be used for all correspondence after initial filing)		Art Unit						
		Examiner Name						
Total Number of Pages in 1	This Submission 20	Attorney Docket Number	NTCP0019USA	NTCP0019USA				
	ENC	LOSURES (Check all that	t apply)					
Fee Transmittal Fo  Fee Attache  Amendment/Reply  After Final  Affidavits/di	ed	Drawing(s)  Licensing-related Papers  Petition  Petition to Convert to a  Provisional Application  Power of Attorney, Revocation  Change of Correspondence Addr	to Apple of Apple (Apple of Apple of Ap	Technolo peal Cor Appeals peal Cor opeal Not	ance communication ogy Center (TC) mmunication to Board and Interferences mmunication to TC dice, Brief, Reply Brief) Information			
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	SIGNATURE C	OF APPLICANT, ATTORN	EY, OR AGENT	Γ				
Individual name	on Hsu, Reg. No.: 41,	526						
Signature Wuslon Hou								
Date 71.77200								
CERTIFICATE OF TRANSMISSION/MAILING								
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PTO/SB/17 (10-03)
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Filing Date   04/09/2004   First Named Inventor   SHAO-KANG CHANG   Examiner Name   Art Unit   Attorney Docket No.   NTCP0019USA   N	FEE TRANSMITTAL			Complete if Known				
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Applicant claims small entity status. See 37 CFR 1.27  TOTAL AMOUNT OF PAYMENT (s) 0.00  METHOD OF PAYMENT (check all that apply)  Check Credit card Money Order O	for EV 2004		Filing Date		04/09/20	04/09/2004		
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NTCP0019USA   Attorney Docket No.   NTCP0019USA	Effective 10/01/2003. Patent fees are subject to annual	revision.	Examiner Name					
Check   Credit card   Money   Other   None   Other   None   Other	Applicant claims small entity status. See 37 CFR 1.27							
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North America Intellectual Property Corp.	Account   50-3105		• • •				•	Fee Paid
Name The Director is authorized to: (check alf that apply) Charge fee(s) indicated below C Credit any overpayments Charge fee(s) indicated below V Credit any overpayments Charge fee(s) indicated below vice of the filing fee to the above-identified deposit account.  FEE CALCULATION 1251 110 1252 420 1252 155 Extension for reply within first month 1253 950 1253 476 Extension for reply within first month 1254 1,489 1254 1,489 1255 2,101 1256 1,480 1257 476 Extension for reply within first month 1258 1,490 1259 1,400 1251 150 1252 240 1252 100 1253 475 Extension for reply within first month 1254 1,489 1255 2,010 1256 1,480 1257 476 Extension for reply within first month 1258 1,490 1259 1,000 1250 476 Extension for reply within first month 1258 1,490 1259 1,000 1250 476 Extension for reply within first month 1250 2,000 1254 1,480 1255 1,000 1255 1,000 1255 1,000 1256 1,000 1257 1,000 1257 1,000 1258 1,000 1258 1,000 1259 1,000 1259 1,000 1250 1,	Deposit	¬   ,,,,				-	-	
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Name (Print/Type) Winston Hsu Registration No. 41 526 Telephone 886289237350					41	526		<u> </u>
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## **PATENT**

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

5 Applicant:

Shao-Kang Chang

Graham Chuang

Yi-Nan Chen

Filing Date:

04/09/2004

Appl. No.:

10/709,054

Docket No.:

NTCP00019USA

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Title:

ETCHANT COMPOSITION FOR SEM IMAGE ENHANCEMENT

OF P-N JUNCTION CONTRAST

15 To:

Commissioner for Patents

P.O. BOX 1450

Alexandria, VA 22313-1450

Subject:

Information Disclosure Statement under 37 CFR §1.56.

20

## Dear Sir/Madam:

This is an Information Disclosure Statement in accordance with the duty to disclose information material to patentability under 37 CFR §1.56. The applicants wish to make of record the document listed on the accompanying form PTO/SB/08. It is respectfully requested that the examiner initials the cited reference on the form and that it be made of record in the application and that a copy of the initialed form be sent to the applicants with the next communication from the examiner.

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Since the IDS is filed before the mailing date of a first Office action on the merits, a petition to request consideration of the information disclosure statement is hereby requested according to 37 CFR §1.97(b). The prior art patent contained in the information disclosure statement was cited in communications from the Taiwan Intellectual Property Office on May 11, 2004 for a counterpart foreign application. Since this IDS is being submitted within three months of the date in which this prior art patent was first cited, the applicants sincerely hope that the examiner can consider the item contained in this IDS.

According to the requirement set forth in 37 CFR §1.98 and MPEP 609 (Rev.1, Feb. 2000), the applicants are submitting a copy of Taiwan Patent No. 304901 filed 08/16/1996 and a concise explanation of the relevance to this application hereinafter. For convenience, claim 1 of the present application is appended at the end of this IDS.

Taiwan Patent No. 304901 discloses cleaning solution for cleaning semiconductor device and cleaning method using the cleaning solution. The cleaning solution is composed of ammonia (NH<sub>4</sub>OH), methanol (CH<sub>3</sub>OH), hydrofluoric acid (HF) and deionized water (H<sub>2</sub>O). The cleaning solution can be manufactured by simply mixing the respective compositions. The cleaning solution can strip polymers and particles within a short time, without etching or damaging the cleaned metal layers. The mixture ratio of the cleaning solution NH<sub>4</sub>OH:CH<sub>3</sub>OH:DI-H<sub>2</sub>O by volume is 1:1-50:0.1-50. The volume of HF is 1-10,000 ppm with respect to the mixture solution of NH<sub>4</sub>OH, CH<sub>3</sub>OH and DI-H<sub>2</sub>O.

FIG. 1 of the prior art patent shows the corrosion depending on the added amount of HF in the case when the semiconductor substrate having metal layers formed thereon is cleaned with the cleaning solution made of the mixture solution of NH<sub>4</sub>OH, CH<sub>3</sub>OH and DI-H<sub>2</sub>O in the volume ratio of 1:10:1 and 500-30,000 ppm of HF added thereto. In FIG. 1, the X-axis represents the added amount of HF and the Y-axis represents the corrosion depth of the metal layers. The corrosion depth of the metal layers increases until the added HF reaches about 600-700 ppm, but gradually decreases thereafter. If the added amount of HF exceeds about 2,000 ppm, the corrosion depth of the metal layers becomes almost zero. In light of the above, the claimed invention of the present application entitled "Etchant Composition For SEM

Image Enhancement Of P-N Junction Contrast" is significantly different from the prior art as disclosed in Taiwan Patent No. 304901.

- 5 Present application claim 1:
  - (Original) An etchant composition comprising:
     an NTC-1 solution prepared by mixing solution "A" comprising an organic acid,
     HF, and nitric acid with a 49% HF solution; and

Date: 215/2004

an NTC-2 solution comprising metal ions and a strong oxidant; wherein said NTC-1 solution and said NTC-2 solution are mixed together at a specific volume ratio.

15

Respectfully Submitted,

20

Winston Hsu, Patent Agent No.41,526

P.O. BOX 506

Merrifield, VA 22116

U.S.A.

e-mail: winstonhsu@naipo.com.tw



control number.

PTO/SB/08A (10-01)

Approved for use through 10/31/2002. OMB 6651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Substitute for form 1449A/PTO

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

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Complete if Known					
Application Number	10/709,054				
Filing Date	04/09/2004				
First Named Inventor	SHAO-KANG CHANG				
Art Unit					
Examiner Name					
Attorney Docket Number	NTCP0019USA				

	U.S. PATENT DOCUMENTS							
Examiner	Cito	Document Number	Publication Date	Name of Patentee or	Pages, Columns, Lines, Where			
Initials*		Number - Kind Code <sup>2</sup> (if known		Applicant of Cited Document	Relevant Passages or Relevant Figures Appear			
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